

ABSTRACT OF THE DISCLOSURE

A method and an apparatus for coupling a light emitting diode (LED) or another light source to an optical waveguide structure via removing a section of a LED resin case to expose a surface closely proximal to a light-emitting face of the semiconductor LED chip. An input end of the optical waveguide is mounted proximal and substantially perpendicular to the surface. The optical waveguide structure and the LED resin case are bonded by, in one embodiment of the invention, a light or thermally curable resin that is applied and further solidified. In a second embodiment of the invention, a photopolymer, sensitive to the light emerging from the waveguide, is used to bond the LED resin case and the optical waveguide structure. An automated coupling system is proposed to optimize the coupling conditions using the in-coupled light efficiency feedback and controller. Finally a method is described allowing the coupling efficiency to be controlled using external excitation forces or light intensity variations, thanks to the electro-optic, magneto-optic, thermo-optic, light polarization sensitive or nonlinear properties of the filler material used between the light emitting device and waveguide.